

IN THE CLAIMS

1. (Currently amended) A probe device for measuring the concentration of at least one volatile component in an aqueous solution, in particular for measuring the concentration of ethanol, comprising:

a probe body with an opening, which is tightly covered by a flat membrane, wherein said membrane is permeable for the volatile component, and

a sensor for measuring the concentration of the volatile component, wherein said sensor is located inside ~~the~~ said probe body and comprises a sensitive surface, which is located in a first measuring space,

wherein an inner side of the flat membrane is part of a second measuring space, wherein the first measuring space and the second measuring space are connected by a measuring aperture, and

wherein the first measuring space is connected to a carrier gas exhaust and the second measuring space is connected to a carrier gas supply.

2. (Currently Amended) The probe device according to claim 1, wherein the flat membrane comprises at least two layers, wherein a the first layer is a porous carrier layer and the second layer comprises a material permeable for the volatile component, and

wherein the first layer and the second layer are attached to each other to form a multi layer structure, wherein the first layer is the inner side of the flat membrane.

3. (Original) The probe device according to claim 2, wherein the porous carrier layer comprises porous PTFE and the material permeable for the volatile component is a silicon polymer.

4. (Currently Amended) The probe device according to claim 2 ~~or 3~~, wherein the first layer has a thickness in the range from ~~0,2 to 3,0~~ 0.2 to 3.0 mm, and wherein the second layer has a thickness in the range from ~~0,01 to 2,0~~ 0.01 to 2.0 mm.

5. (Currently Amended)The probe device according to ~~any of the claims 1 to 4,~~claim 1 wherein the first measuring space has a volume in the range from 10 to ~~10.000~~ 10,000 mm³ and the second measuring space has a volume in the range from 10 to ~~10.000~~ 10,000 mm³.

6. (Currently Amended)The probe device according to ~~any of the claims 1 to 5~~claim 1, wherein the measuring aperture has an opening area in the range from 1 to 100 mm² and a length, measured in directions orthogonal to the opening area, in the range from ~~0,2~~ 0.2 to 10 mm.

7. (Currently Amended)The probe device according to ~~any of the claims 1 to 6~~ claim 1, wherein the second measuring space consists of a pore space of a porous material, preferably of the pore space of the first layer of the flat membrane.

8. (Currently Amended)A method for operating a probe device according to ~~any of the claims 1 to 7~~ claim 1, wherein the flat membrane is contacted with the aqueous solution containing the volatile component, wherein the carrier gas supply is connected to a carrier gas source via means for controlling gas flow rates, wherein a defined gas flow from the carrier gas source ~~thru~~ through the carrier gas supply into the second measuring space, from the second measuring space through the measuring aperture into the first measuring space, and from the first measuring space to the carrier gas exhaust, is established by operation of the means for controlling gas flow rates, and

wherein the gas flow rate is adjusted in the range from 5 to 100 ml/min.

9. (New) The probe device according to claim 1, wherein the probe body comprises three elements, a first element, a second element and a third element, each of the three elements coaxially arranged.

10. (New) The probe device according to claim 9, wherein the three probe body elements are insertable into each other and are sealed against each other by at least one seal member.

11. (New) The probe device according to claim 9, wherein the three probe body elements are cylindrical.

12. (New) The probe device according to claim 9, wherein a ring element is located at a front end of the second element.

13. (New) The probe device according to claim 12, wherein the inside of the ring element is part of an inner wall of the second measuring space.

14. (New) The probe device according to claim 12, wherein the ring element is an integral part of the second element.

15. (New) The probe device according to claim 12, wherein the ring element is mounted to the second element.

16. (New) The probe device according to claim 12, wherein the ring element includes a plurality of radially oriented channels.

17. (New) The probe device according to claim 16, wherein each of the plurality of channels lead to the second measuring space.

18. (New) The probe device according to claim 17, wherein there are four channels.